What is claimed is:

1. A material comprising a substrate and an enhanced surface area, said enhanced surface area comprising a multitude of non-hydrolyzable, non-leachable polymer chains covalently bonded by non-siloxane bonds to said substrate; wherein said non-hydrolyzable, non-leachable polymer chains comprise a multitude of antimicrobial groups attached to said non-hydrolyzable, non-leachable polymer chains by covalent bonds; and wherein a sufficient number of said non-hydrolyzable, non-leachable polymer chains are covalently bonded to sites of said substrate to render the material antimicrobial, or receptive to avid binding of negatively charged dye molecules, when exposed to aqueous fluids, menses, bodily fluids, skin, cosmetic compositions, or wound exudates, wherein said material has associated therewith a plurality of anionically charged biologically or chemically active compounds.

2. The material of claim 1, wherein said antimicrobial groups comprise at least one quaternary ammonium structure.

3. The material of claim 1, wherein said antimicrobial groups comprise at least one non-ionic structure.

4. The material of claim 3, wherein said at least one non-ionic structure comprises a biguanide.

5. The material of claim 1, wherein said non-hydrolyzable, non-leaching polymer chains have an average degree of polymerization selected from about 5 to 1000, 10 to 500, and 10 to 100.

6. The material of claim 1, wherein said material comprises all or part of a wound dressing, sanitary pad, a tampon, an intrinsically antimicrobial absorbent dressing, a diaper, toilet paper, a sponge, a sanitary wipe, isolation and surgical gowns, gloves, surgical scrubs, sutures, sterile packaging, floor mats, lamp handle covers, burn dressings, gauze rolls, blood transfer tubing or storage container, mattress cover, bedding, sheet, towel, underwear, socks, cotton swabs, applicators, exam table covers, head covers, cast liners, splint, paddings, lab coats, air filters for autos, planes or HVAC systems, military protective garments, face masks, devices for protection against biohazards and biological warfare agents, lumber, meat or fish packaging material, apparel for food handling, paper currency, powder, and other

surfaces required to exhibit a non-leaching antimicrobial property and to release over time portions of said biologically or chemically active compound.

7. The material of claim 1, wherein said substrate is comprised, in whole or in part, of cellulose, or other naturally-derived polymers.

8. The material of claim 1 wherein said substrate is comprised, in whole or in part, of synthetic polymers including, but not limited to: polyethylene, polypropylene, nylon, polyester, polyurethane, or silicone.

9. The material of claim 1, wherein said attachment of said non-hydrolyzable, non-leachable polymer to said substrate is via a carbon-oxygen-carbon bond, also known as an ether linkage, a carbon-carbon bond, and mixtures thereof.

10. The material of claim 9, wherein a cerium-containing catalyst, a peroxide containing catalyst, an Azo catalyst, a redox initiator, a thermolabile or photolabile catalyst catalyzes formation of said ether linkage or said carbon-carbon bond.

11. The material of claim 1 wherein said non-hydrolyzable, non-leachable polymer chains are formed by polymerization of allyl- or vinyl-containing monomers.

12. The material of claim 11 wherein said allyl- or vinyl- monomers are selected from the group consisting of: styrene derivatives, allyl amines, and ammonium salts.

13. The material of claim 11 wherein said allyl- or vinyl- monomers are selected from the group consisting of: acrylates, methacrylates, acrylamides, and methacrylamides.

14. The material of claim 13 wherein said allyl- or vinyl-containing monomers are selected from the group consisting of: compounds of the structure CH_2=CR-(C=O)-X-$(CH2)_n$-N^+R'R"R'"//Y^-; wherein, R is hydrogen or methyl, n equals 2 or 3, X is either O, S, or NH, R', R", and R'" are independently selected from the group consisting of H, C1 to C16 alkyl, aryl, arylamine, alkaryl, and aralkyl, and Y- is an acceptable anionic counterion to the positive charge of the quaternary nitrogen; diallyldimethylammonium salts; vinyl pyridine and salts thereof; and vinylbenzyltrimethylammonium salts.

15. The material of claim 14 where said allyl- or vinyl-containing monomers are selected from the group consisting of: dimethylaminoethyl methacrylate:methyl chloride quaternary; and dimethylaminoethyl methacrylate:benzyl chloride quaternary.

16. The material of claim 6 wherein said powder is mica.

17. A superabsorbent material for absorbing biological fluids, comprising a substrate and an enhanced surface area, said enhanced surface area comprising a multitude of non-hydrolyzable, non-leachable polymer chains covalently bonded by non-siloxane bonds to said substrate; wherein said non-hydrolyzable, non-leachable polymer chains comprise a multitude of antimicrobial groups attached to said non-hydrolyzable, non-leachable polymer chains by covalent bonds; and wherein a sufficient number of said non-hydrolyzable, non-leachable polymer chains are covalently bonded to sites of said flexible substrate to render the material antimicrobial when exposed to aqueous fluids, menses, bodily fluids, or wound exudates; wherein said superabsorbent material is capable of absorbing about 30 or more times its own weight of water or other fluids in a single instance; and wherein said absorbing capacity is the result of branching or crosslinking of said non-hydrolyzable, non-leachable polymer chains, wherein said material has associated therewith a plurality of anionically charged biologically or chemically active compounds.

18. The material of claim 17, wherein said antimicrobial groups comprise at least one quaternary ammonium structure.

19. The material of claim 17, wherein said antimicrobial groups comprise at least one non-ionic structure.

20. The material of claim 19, wherein said at least one non-ionic structure comprises a biguanide.

21. The material of claim 17, wherein said material comprises all or part of a wound dressing, sanitary pad, a tampon, an intrinsically antimicrobial absorbent dressing, a diaper, toilet paper, a sponge, a sanitary wipe, food preparation surfaces, gowns, gloves, surgical scrubs, sutures, needles, sterile packings, floor mats, lamp handle covers, burn dressings, gauze rolls,

blood transfer tubing or storage container, mattress cover, bedding, sheet, towel, underwear, socks, cotton swabs, applicators, exam table covers, head covers, cast liners, splint, paddings, lab coats, air filters for autos planes or HVAC systems, military protective garments, face masks, devices for protection against biohazards and biological warfare agents, lumber, meat packaging material, paper currency, powders, and other surfaces required to exhibit a non-leaching antimicrobial or enhanced dye binding properties, and to release over time portions of said biologically or chemically active compound.

22. The material of claim 17, wherein said substrate is comprised, in whole or in part, of cellulose, or other naturally-derived polymers.

23. The material of claim 17 wherein said substrate is comprised, in whole or in part, of synthetic polymers including, but not limited to: polyethylene, polypropylene, nylon, polyester, polyurethane, or silicone.

24. The material of claim 17, wherein said attachment of said non-hydrolyzable, non-leachable polymer to said substrate is via a carbon-oxygen-carbon bond, also known as an ether linkage, a carbon-carbon bond, or mixtures thereof.

25. The material of claim 24, wherein a cerium-containing catalyst, a peroxide containing catalyst, an Azo catalyst, a thermolabile or photolabile catalyst catalyzes formation of said ether linkage or said carbon-carbon linkage, or mixtures thereof.

26. The material of claim 17 wherein said non-hydrolyzable, non-leachable polymer chains are formed by polymerization of allyl- or vinyl-containing monomers.

27. The material of claim 26 wherein said allyl- or vinyl- monomers are selected from the group consisting of: styrene derivatives; and allyl amines or ammonium salts.

28. The material of claim 26 wherein said allyl- or vinyl- monomers are selected from the group consisting of: acrylates, methacrylates, acrylamides, and methacrylamides.

29. The material of claim 28 wherein said allyl- or vinyl-containing monomers are selected from the group consisting of: compounds of the structure CH_2=CR-(C=O)-X-$(CH2)_n$-

$N^+R'R''R'''//Y^-$; wherein, R is hydrogen or methyl, n equals 2 or 3, X is either O, S, or NH, R', R", and R'" are independently selected from the group consisting of H, C1 to C16 alkyl, aryl, arylamine, alkaryl, and aralkyl, and Y- is an acceptable anionic counterion to the positive charge of the quaternary nitrogen; diallyldimethylammonium salts; vinyl pyridine and salts thereof; and vinylbenzyltrimethylammonium salts.

30. The material of claim 29 where said allyl- or vinyl-containing monomers are selected from the group consisting of: dimethylaminoethyl methacrylate:methyl chloride quaternary; and dimethylaminoethyl methacrylate:benzyl chloride quaternary.

31. An inherently antimicrobial composition comprising:
    a. a substrate;
    b. a coating, layer, or enhanced surface area on said substrate, comprised of a plurality of polymeric molecules of variable lengths bearing antimicrobial groups, wherein said polymeric molecules are covalently, non-leachably bound to said substrate, and wherein said coating, layer, or enhanced surface area exhibits antimicrobial activity due to the presence of said antimicrobial groups; and
    c. ionically associated biologically or chemically active compounds which are released from said substrate and coating layer over a period of time.

32. The composition of claim 31, wherein said antimicrobial groups comprise at least one quaternary ammonium structure.

33. The composition of claim 31, wherein said antimicrobial groups comprise at least one non-ionic structure.

34. The composition of claim 33, wherein said at least one non-ionic structure comprises a biguanide.

35. The composition of claim 31, wherein said material comprises all or part of a wound dressing, sanitary pad, a tampon, an intrinsically antimicrobial absorbent dressing, a diaper, toilet paper, a sponge, a sanitary wipe, food preparation surfaces, gowns, gloves, surgical scrubs, sutures, needles, sterile packings, floor mats, lamp handle covers, burn dressings,

gauze rolls, blood transfer tubing or storage container, mattress cover, bedding, sheet, towel, underwear, socks, cotton swabs, applicators, exam table coves, head covers, cast liners, splint, paddings, lab coats, air filters for autos, planes or HVAC systems, military protective garments, face masks, devices for protection against biohazards and biological warfare agents, lumber, meat packaging material, paper currency, powders, and other surfaces required to exhibit a non-leaching antimicrobial or enhanced dye binding properties, and to release over time portions of said biologically or chemically active compound.

36. The composition of claim 31, wherein said substrate is comprised, in whole or in part, of cellulose, or other naturally-derived polymers.

37. The composition of claim 31 wherein said substrate is comprised, in whole or in part, of synthetic polymers including, but not limited to: polyethylene, polypropylene, nylon, polyester, polyurethane, or silicone.

38. The composition of claim 31, wherein said attachment of said non-hydrolyzable, non-leachable polymer to said substrate is via a carbon-oxygen-carbon bond, also known as an ether linkage, via a carbon-carbon bond, or mixtures thereof.

39. The composition of claim 38, wherein a cerium-containing catalyst, a peroxide containing catalyst, an Azo catalyst, a thermolabile or photolabile catalyst catalyzes formation of said ether linkage or said carbon-carbon linkage, or mixtures thereof.

40. The composition of claim 31 wherein said non-hydrolyzable, non-leachable polymer chains are formed by polymerization of allyl- or vinyl-containing monomers.

41. The composition of claim 40 wherein said allyl- or vinyl- monomers are selected from a group consisting of: styrene derivatives; allyl amines and ammonium salts.

42. The composition of claim 40 wherein said allyl- or vinyl- monomers are selected from the group consisting of: acrylates, methacrylates, acrylamides, and methacrylamides.

43. The composition of claim 42 wherein said allyl- or vinyl-containing monomers are selected from the group consisting of: compounds of the structure CH_2=CR-(C=O)-X-$(CH2)_n$-

$N^+R'R''R'''//Y^-$; wherein, R is hydrogen or methyl, n equals 2 or 3, X is either O, S, or NH, R', R", and R"' are independently selected from the group consisting of H, C1 to C16 alkyl, aryl, arylamine, alkaryl, and aralkyl, and Y- is an acceptable anionic counterion to the positive charge of the quaternary nitrogen; diallyldimethylammonium salts; vinyl pyridine and salts thereof; and vinylbenzyltrimethylammonium salts.

44. The composition of claim 43 where said allyl- or vinyl-containing monomers are selected from the group consisting of: dimethylaminoethyl methacrylate:methyl chloride quaternary; and dimethylaminoethyl methacrylate:benzyl chloride quaternary.

45. The antimicrobial composition of claim 44, wherein said substrate is selected from the group consisting of: woven or nonwoven flexible matrices, wherein said composition is formed into the shape of a wound dressing and a powder.

46. The antimicrobial composition of claim 44, wherein said coating absorbs aqueous liquids.

47. The antimicrobial composition of claim 44, wherein said substrate is wood, lumber, or an extract or a derivative of wood fiber.

48. A method for the preparation of a non-leaching antimicrobial-coated composition, comprising the steps of:

a. immersing all or a portion of a substrate into a solution comprising a sufficient quantity of monomer bearing at least one antimicrobial group per monomer molecule, and a sufficient quantity of catalyst to sustain polymerization reactions to sufficiently coat said substrate to impart an antimicrobial characteristic;
b. maintaining the contact of said substrate with said solution under acceptable conditions for a sufficient period of time to complete said reaction, wherein said reactions comprise forming polymers of varying lengths, and forming covalent, non-siloxane bonds between the majority of said polymers of varying lengths and binding sites on said substrate;
c. rinsing said substrate sufficiently to remove non-polymerized monomer molecules, non-stabilized polymer molecules, and catalyst;
d. drying said substrate to a desired low moisture content, such that the substrate is not a hydrogel; and

e. contacting the thus prepared substrate with sufficient anionic or cationic biologically or chemically active compound to achieve ionic association between said compound and said substrate.

49. The method of claim 48, additionally comprising the step of maintaining the solution and gases in contact with the solution free of oxygen by sparging with an inert gas.

50. The method of claim 48, wherein said rinsing is with an aqueous solution, and additionally comprising the step of dewatering the substrate after the rinsing step.

51. The method of claim 48 wherein the catalyst is selected from the group consisting of: a cerium salt, a peroxide, a persulfate, an Azo catalyst, and a photolabile or thermolabile catalyst.

52. An antimicrobial-coated composition for destruction of microbes contacting said composition, comprising:

a. a substrate onto which a coating of antimicrobial polymers is bonded;

b. said coating, formed of an effective amount of polymeric molecules having a multiplicity of quaternary ammonium groups, wherein said polymeric molecules are non-leachably and covalently bonded to surface sites of said substrate, wherein said polymers do not form using siloxane bonds, and wherein said coating is absorbent of aqueous liquids, and

c. associated anionic biologically active or chemically active compound;

whereby said multiplicity of quaternary ammonium groups act to destroy microbes coming in contact with said groups as well as to bind and release said anionic biologically active or chemically active compound.

53. A composition comprising mica which has been subjected to coating, grafting, binding or adhesion of a quaternary amine polymer, followed by association of anionic biologically or chemically active compounds with said quaternary amine polymer.

54. The composition according to claim 1 wherein said plurality of anionically charged biologically or chemically active compounds are selected from the group consisting

of: antibiotics, analgesics, anti-inflammatories, strong oxidizing agents, matrix metalloproteinase inhibitors, proteins, peptides, fragrances, and antifungals.

55. The composition according to claim 17 wherein said plurality of anionically charged biologically or chemically active compounds are selected from the group consisting of: antibiotics, analgesics, anti-inflammatories, strong oxidizing agents, matrix metalloproteinase inhibitors, proteins, peptides, fragrances, and antifungals.

56. The composition according to claim 31 wherein said ionically associated biologically or chemically active compounds which are released from said substrate and coating layer over a period of time are selected from the group consisting of: antibiotics, analgesics, anti-inflammatories, strong oxidizing agents, matrix metalloproteinase inhibitors, proteins, peptides, fragrances, and antifungals.

57. The method according to claim 48 wherein said sufficient anionic or cationic biologically or chemically active compound to achieve ionic association between said compound and said substrate are selected from the group consisting of: antibiotics, analgesics, anti-inflammatories, strong oxidizing agents, matrix metalloproteinase inhibitors, proteins, peptides, fragrances, and antifungals.

58. The composition according to claim 52 wherein said associated anionic biologically active or chemically active compound is selected from the group consisting of antibiotics, analgesics, anti-inflammatories, strong oxidizing agents, matrix metalloproteinase inhibitors, proteins, peptides, fragrances, and antifungals.

59. The composition according to claim 53 wherein said anionic biologically or chemically active compounds associated with said quaternary amine polymer is selected from the group consisting of antibiotics, analgesics, anti-inflammatories, strong oxidizing agents, matrix metalloproteinase inhibitors, proteins, peptides, fragrances, and antifungals.

60 A method for treating skin ulcers, bed sores, or chronic wounds which comprises contacting said skin ulcers, bed sores, or chronic wounds with a substrate comprising a polyionic polymer bound to said substrate and a sufficient quantity of matrix metalloproteinase inhibitor ionically associated with said polyionic polymer to achieve extended release of said matrix metalloproteinase onto and into said skin ulcer, bed sore or chronic wound to reduce or eliminate endogenous matrix metalloproteinase activity in said skin ulcer, bed sore or chronic wound.

61. A method of treating a wound which comprises contacting said wound with a substrate comprising a polyionic polymer bound to said substrate and a sufficient quantity of antibiotic, analgesic, anti-inflammatory, or combinations thereof, ionically associated with said polyionic polymer to achieve extended release of said antibiotic, analgesic, anti-inflammatory, or combinations thereof onto and into said wound to reduce or eliminate microbial infection, pain, inflammation at said wound site.

62. An article of clothing comprising a bound polyionic polymer charged with oppositely charged ionic fragrances, antibiotics, antifungals, or combinations thereof.